IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

RENEWED PETITION UNDER 37 CFR 1.137(a) and 1.137(b)

APPLICANT:	Michael J. Allen et al.	EXAMINER: Nathan Andrew Bowers
SERIAL NO.:	10/690,809	GROUP ART UNIT: 1744
FILING DATE:	October 21, 2003	CONFIRMATION NO.: 9427
INVENTION:	NANOMOTION SENSING SYSTEM AND METHOD	

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SIR:

Applicants respectfully request reconsideration of the petition for withdrawal of the abandonment of the above-identified application in accordance with 37 CFR §1.137(a) and (b). Enclosed herewith is (1) the reply required for the outstanding office action, (2) the $270 fee for the 1.137(a) petition as already been paid with the petition filed July 8, 2009, and (3) a statement as set forth below that the entire delay in filing which resulted in the abandonment was unavoidable, or in the alternative, unintentional.

A Decision on Petition on the previous petition was mailed September 3, 2009. The Decision noted that there was no indication that the person signing the petition was given power of attorney to prosecute the application. This statement is in error. The prior petition was filed with a Revocation and New Power of Attorney. The same Revocation and New Power of Attorney has since been resubmitted and accepted by the Patent Office as indicated by the Notice of Acceptance of Power of Attorney dated October 7, 2009.

Statement under 37 CFR §1.137(a)(3) or in the alternative 1.137(b)(3)

The present application was filed on October 21, 2003, by the law firm of Pillsbury Winthrop LLP, on behalf of the inventors Michael J. Allen and Lucien Ghislain. On April 5, 2004, an assignment of the inventors' interest in the patent application to Alegis Microsystems was recorded. A new power of attorney and revocation of prior powers signed by Michael J. Allen, an inventor and president of the assignee Alegis Microsystems was filed in September, 2005, giving power of attorney to James E. Eakin. This first revocation and power of attorney was accepted by the U.S. Patent and Trademark Office in October, 2005.

On August 22, 2007, a Request for Continued Examination and an Amendment were filed by Schiff Hardin LLP. A revocation and new power of attorney to Schiff Hardin LLP followed on November 9, 2007, signed by Mr. Allen, an inventor and the president of the assignee Alegis Microsystems.

The Examiner issued a response to the Request for Continued Examination and the Amendment that was sent only to James Eakin, as was the rejection of the revocation and new power of attorney to Schiff Hardin LLP. Neither the inventors, nor the firm filing the new power of attorney and the RCE were provided with these responses by Mr. Eakin. No communication from the USPTO was passed from the former attorney to the inventors or Schiff Hardin LLP until after the application had been abandoned.

The Examiner issued a non-final rejection on October 17, 2007 of the application, as amended by the amendment accompanying the RCE prepared by Applicants and Schiff Hardin LLP, indicating that the finality of the previous Office Action had been withdrawn and the applicants' submission had been considered, but that it did not place the application into condition for allowance. As noted, this rejection was sent only to Mr. Eakin and was never forwarded to the inventors nor to the firm filing the RCE and amendment to which the office action responded. The time for responding to the October 17, 2007 Office Action passed and Applicants were still unaware that the revocation of the former power of attorney had been rejected by the USPTO and that another Office Action had been issued. In the absence of a response to the October 17, 2007 Office Action, the Examiner issued a Notice of Abandonment dated July 7, 2008, indicating that the application has been abandoned. The Notice of Abandonment was sent only to Mr. Eakin.

The former attorney who had not forwarded either the rejection of the new power of attorney or the October 17, 2007 office action to Applicants did forward the notice of abandonment to Mr. Allen. Only after receipt of the notice of abandonment did the Applicants or the undersigned attorneys become aware of the rejection of the revocation and new power of attorney or the October 17, 2007 office action. The abandonment and the delay in filing the response were entirely unavoidable.

Following receipt of the notice of abandonment, Mr. Allen and members of the Schiff Hardin LLP firm began exchanging correspondence concerning the response to the action and subsequently exchanged a series of draft responses to the action. The correspondence and

exchange of draft responses continued from shortly after the receipt of the notice of abandonment to the filing of the response on July 8, 2009. The July 8, 2009, response was not entered according to the Decision on Petition and is resubmitted herewith. As such, the entire delay in filing the required reply from the due date for the required reply until the filing of the response was unavoidable, or in the alternative, was unintentional.

Conclusion

Applicants respectfully requests reconsideration of the petition for withdrawal of the unavoidable abandonment of the present application. In the alternative, applicants respectfully petition for withdrawal of the unintentional abandonment of the present application.

All deficiencies with respect to the change of address, revocation and new power of attorney, and statement of unintentional abandonment noted in the September 3, 2009 Petition Decision have been met. Further, a response to the pending office action is being filed herewith. As such, all conditions for granting of the present petition have been met.

Favorable consideration of the present petition is hereby requested.

Deposit Account Information

The Commissioner is hereby authorized to charge any additional fees which may be required or to credit any overpayment to account no. 501519.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

AMENDMENT

APPLICANT:	Michael J. Allen et al.	EXAMINER: Nathan Andrew Bowers
SERIAL NO.:	10/690,809	GROUP ART UNIT: 1744
FILING DATE:	October 21, 2003	CONFIRMATION NO.: 9427
INVENTION:	NANOMOTION SENSING SYSTEM AND METHOD	

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P.O. Box 1450
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SIR:

In connection with the Petition to Revive this application and in response to the Office Action ("OA") dated October 17, 2007, please amend the claims as follows.

Amendments to the claims begin on page 2.

Remarks begin on page 6.

IN THE CLAIMS

Please amend the claims as indicated below by the markings. Claims 9-10 and 27-32 are cancelled without prejudice.

1. (Currently Amended) A motion sensor, comprising

a chamber capable of holding a medium wherein the medium includes a motile sample;

at least one force transducing sensor positioned to interact dynamically with said motile sample; and

a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the

~~means for detecting the motion of said motile sample through~~ dynamic interaction of the force transducing sensor with said motile sample ~~whereby a characteristic of said motile sample can be deduced~~.

2. (Previously Presented) The motion sensor of claim 1 wherein the motile sample includes at least one biological specimen.

3. (Previously Presented) The sensor of claim 1 wherein the force transducing sensor is a MEMS device.

4. (Previously Presented) The sensor of claim 3 where the MEMS device is a cantilever.

5. (Previously Presented) The sensor of claim 1 wherein the motile samples include biological specimens.

6. (Previously Presented) The sensor of claim 5 where the biological specimens are cells.

7. (Previously Presented) The sensor of claim 1 wherein the means for detecting uses optics.

8. (Previously Presented) The sensor of claim 1 wherein the medium is appropriate for biological specimens.

9-10. (Cancelled)

11. (Previously Presented) The sensor of claim 1 wherein the force transducing sensor includes a ribbon.

12. (Previously Presented) The sensor of claim 4 wherein the cantilever has a width that increases with distance measured from the cantilever support.

13. (Currently Amended) A motion sensing system comprising

a chamber adapted to receive ~~a having therein~~ a multiplicity of motile ~~specimens~~ samples;

at least one force transducing sensor positioned within the chamber so as to be immersed in the medium during operation;

force transducing sensor surface coatings having characteristics appropriate for the motile specimens; and

a motion detector for detecting motion of the force transducing sensor caused by the motion of the motile ~~specimens~~ samples whereby the residence times of the motile ~~specimens~~ samples on the force transducing sensor surface coatings can be determined.

14. (Currently Amended) The motion sensing system of claim 13 wherein the motile ~~specimens~~ samples are part of a biological sample.

15. (Previously Presented) The motion sensing system of claim 13 wherein the force transducing sensor surface coatings are biologically active surface coatings.

16. (Previously Presented) The motion sensing system of claim 13 wherein the force transducing sensor is a MEMS device.

17. (Previously Presented) The motion sensing system of claim 16 wherein the MEMS device is a cantilever.

18. (Previously Presented) The motion sensing system of claim 17 wherein the MEMS device includes at least two cantilevers.

19. (Previously Presented) The motion sensing system of claim 18 wherein one cantilever is a reference cantilever with a biologically inactive surface coating.

20. (Previously Presented) The sensor of claim 5 wherein the biological samples are sperm.

21. (Previously Presented) A motion sensor comprising

a chamber adapted to receive for analysis a medium having therein a multiplicity of motile ~~specimens~~ samples moving within the medium with a motile frequency;

at least one force transducing sensor positioned within the chamber so as to be immersed in the medium during analysis and to interact dynamically with the motile ~~specimens~~ samples;

and a motion detector for determining the characteristic motile frequency of the ~~specimens~~ samples by detecting the dynamic interaction of the force transducing sensor.

22. (Currently Amended) The motion sensor of claim 21 wherein the motile ~~specimens~~ samples are biologically motile.

23. (Currently Amended) The motion sensor of claim 22 wherein the motile ~~specimens~~ samples are sperm.

24. (Previously Presented) The motion sensor of claim 21 wherein the force transducing sensor is a MEMS device.

25. (Previously Presented) The motion sensor of claim 24 wherein the MEMS device is a cantilever.

26. (Currently Amended) A method for determining characteristics of a motile sample under analysis comprising the steps of

~~providing at least one force transducing sensor having a surface;~~

~~providing motile specimens in a fluid;~~

~~the surface having a coating thereon capable of interacting with the motile specimens;~~

directing ~~the~~ motile ~~specimens~~ samples in a fluid toward the surface of at least one force transducing sensor at an angle substantially orthogonal to the surface,

causing an interaction between the motile ~~specimens~~ samples and a coating on the surface capable of interacting with the motile samples;

allowing said motile ~~specimens~~ samples to interact with the force transducing sensor; and

detecting a measureable characteristic of the motile ~~specimens~~ samples in accordance with ~~its~~ the interaction with the force transducing sensor.

27-32. (Cancelled)

Remarks

In the Office Action of October 17, 2007, the Examiner rejected Claims 1 – 5, 8, 13 – 18, and 26 as being anticipated under §102(b) by Furcht (U.S. Patent No. 6,054,277); claim 26 as being anticipated under §102(b) by Thundat (U.S. Patent No. 6,289,717, or "Thundat '717"); and Claims 1 – 5, 7, 8, 13 – 18, and 21 – 25 as being anticipated under §102(e) by Welland (U.S. Patent Pub. No. 2003 0222232).

The Examiner also rejected Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat '717 in view of Thundat (U.S. Patent No. 6,016,686, or "Thundat '686"); Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat '717 in view of Thundat '686; Claims 9 and 10 as obvious under §103(a) over Welland in view of Negersmith (U.S. Patent No. 4,300,906); claim 11 as obvious under §103(a) over Furcht (U.S. Patent No. 6,054,277) in view of Polla (U.S. Patent No. 5,536,963); and Claims 27 - 32 as obvious under §103(a) over Welland in view of Paritsky (U.S. Publication No. 2003 0209656).

Applicants have cancelled claims 27-32 without prejudice and have provided discussion below for distinguishing the present claims, as amended, from the art cited against them.

35 USC §102(b)

The Examiner rejected Claims 1 – 5, 8, 13 – 18, and 26 as being anticipated under §102(b) by Furcht. Furcht discloses a genetic testing system that uses a cantilever to detect the binding of a specific analyte or specific DNA product to a molecular recognition surface. The change in force detected by the system is due to the sample binding to the cantilever. While both Furcht and these embodiments of the invention disclose methods of using a force transducing sensor such as a cantilever with biological samples, the forces measured by the sensor are different, as are the characteristics of the sample determined by the force measurement.

Claim 1 includes a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. Furcht does not disclose the use of the invention to allow

information about the samples to be determined through the interaction between the sample and the cantilever in the same way as the present invention. While the term "characteristic" is used in claim 17 of Furcht, the specification discloses only the detection of particular genetic material through binding to a particular analyte on the cantilever surface, resulting in the display of a positive or negative result. (Furcht, column 6, line 62 through column 7, line 4). Thus, the invention in Furcht functions only to determine the presence or absence of particular genetic material. Here, the invention is directed at being able to detect measureable data and provide information beyond whether a specific component is absent or present in the sample being tested. The invention in Furcht is designed to detect the binding event, which would indicate that the desired DNA or RNA fragments were present in the sample. It does not determine any measureable characteristics of the DNA or RNA fragments through their interaction with the cantilever. Applicants assert that Claim 1 is in condition for allowance over Furcht. Claims 2 – 5 and 8 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. The Furcht reference teaches a method of using motion caused by the interaction of genetic material in the sample with the surface coating of a cantilever to detect a whether the desired DNA or RNA is present in the sample. (Furcht, column 6, line 62 through column 7, line 4). Furcht does not disclose the use of a cantilever to determine residence times of samples on a sensor, as the purpose of the invention disclosed in Furcht is only to detect particular genetic material and does not look beyond the "binding event" caused when the genetic material binds to the surface of the cantilever. Applicants assert that Claim 13 is in condition for allowance over Furcht. Claims 14 – 18 depend on Claim 13 and are also in condition for allowance.

Claim 26 describes a method for determining measureable characteristics of a motile sample. In order to accurately determine the measureable characteristics, Claim 26 requires that the samples be directed at the surface of the sensor at an angle substantially orthogonal to the surface. It is not necessary for the samples in Furcht to be directed at the cantilever in any particular angle. The system in Furcht is detecting whether a binding event occurs, not

making measurements that depend on the angle of the force of the interaction between the sample and the sensor. In claim 26, the measureable characteristics of the sample are detected through the interaction between the sensor and the sample, not through the presence or absence of any interaction at all, as in the Furcht reference. Applicants assert that Claim 26 is in condition for allowance over Furcht.

The Examiner rejected claim 26 as being anticipated under §102(b) by Thundat '717. Thundat '717 is directed at providing a cantilever with a surface coating that will react with one or more of the components of a given sample. The invention in Thundat '717 is directed at detecting and quantifying the presence of some material in a sample, rather than trying to determine characteristics of that material through its interaction with the sensor. (Thundat '717, column 2, lines 18-36). Thundat '717 does not disclose the limitation of directing the samples toward the surface of the cantilever at an angle substantially orthogonal to the surface. The method of detection in Thundat '717 does not require that the sample come in contact with the cantilever at any particular angle. Even where applied to living cells (Thundat '717, Example 2), the method disclosed serves to detect the presence of a living cell in a sample. For the methods of detection disclosed in Thundat '717, any interaction between the coating on the cantilever and the material in the sample will achieve the desired result. Control over the angle at which the cantilever is contacted is not necessary to take an accurate measurement of whether some substance is present in the sample. The method disclosed in claim 26 measures measureable characteristics of a sample, not the mere presence or absence of the sample. In order to properly determine measureable characteristics of the sample from measurements of its movement, the angle of interaction between the surface of the force transducing sensor and the sample must be known and controlled. As Thundat '717 does not disclose all limitations of Claim 26, Applicants assert that Claim 26 is in condition for allowance over Thundat '717.

The Examiner rejected Claims 1 – 5, 7, 8, 13 – 18, and 21 – 25 as being anticipated under §102(e) by Welland. As discussed in paragraphs [0001] and [0005] – [0007] of the reference, Welland discloses a method of detecting components in a sample that utilizes a cantilever to detect interaction between the molecules in the sample and a surface coating on the cantilever. Claim 1 includes a detector that allows a measureable characteristic of

the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. Welland does not disclose, not is it necessarily designed to allow information about measureable characteristics of the samples to be determined through the interaction of the sample and the cantilever. The invention in Welland functions only to determine the presence, absence, or quantity of molecules, not measureable characteristics of those molecules. Claim 1 is in condition for allowance over Welland. Claims 2 – 5, 7 and 8 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. As discussed in paragraphs [0001] and [0005] – [0007] of Welland, the Welland reference teaches a method of using motion caused by the interaction of molecules in the sample with the surface coating of a cantilever to detect whether such molecules are present in the sample and in what quantities. Welland does not disclose the use of a cantilever to determine residence times of samples on a sensor. Applicants assert that Claim 13 should be allowable over Welland. Claims 14 – 18 depend on Claim 13 and should also be allowable.

Claims 21 – 25 describe a method for determining the characteristic motile frequency of a multiplicity of motile samples. As discussed in paragraphs [0001] and [0005] – [0007] of Welland, the Welland reference teaches a method of using motion caused by the interaction of molecules in the sample with the surface coating of a cantilever to detect whether such molecules are present in the sample and in what quantities. The configuration in Welland is designed for detection of the presence of molecules in a sample and is distinct from the configuration in this embodiment of the invention. Applicants assert that Claim 21 is in condition for allowance over Welland. Claims 22 – 25 depend on Claim 21 and are also in condition for allowance.

For these reasons, and based on the amendments to the claims, Applicants respectfully request that the 35 U.S.C. §102 rejections be withdrawn from the application.

35 USC §103(a)

The Examiner also rejected Claims 1 – 8 and 12 - 25 as obvious under §103(a) over Thundat '717 in view of Thundat '686. Independent Claims 1, 13, and 21 all contain limitations not suggested by any combination of the Thundat references.

Claim 1 includes a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to detecting the motion of a sample through dynamic interaction of the force transducing sensor with the sample whereby a measureable characteristic of the sample can be deduced. Applicants assert that Claim 1 should thus be allowable over Thundat. Claims 2 – 5 and 8 depend on Claim 1 and should also be allowable.

Applicants assert that Claim 1 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 2 – 8, 12 and 20 depend on Claim 1 and are also in condition for allowance.

Claim 13 includes a motion detector that is capable of determining the residence times of the samples on the force transducing sensor surface coatings. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to determine the residence times of samples on a sensor. Applicants assert that Claim 13 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 14 – 19 depend on Claim 13 and are also in condition for allowance.

Claims 21 – 25 describe a method for determining the characteristic motile frequency of a multiplicity of motile samples. The devices disclosed in the Thundat references are directed at detecting and quantifying material in a sample. Thundat '717 does mention

detecting a living cell and Thundat '686 discloses detecting changes in hydrogen ion concentration to detect the presence of a living organism. Neither reference, nor the combination of the two suggests that the invention may be used to determine the characteristic motile frequency of motile samples. While both may be capable of detecting the presence of motile cells, mere detection and determination of the characteristic motile frequency of those cells are distinct inventions. Applicants assert that Claim 21 is in condition for allowance over Thundat '717 in view of Thundat '686. Claims 22 – 25 depend on Claim 21 and are also in condition for allowance.

The Examiner rejected Claim 11 as obvious under §103(a) over Furcht in view of Polla. The Examiner points out that Polla discloses a plurality of microcantilevers that in one embodiment form a ribbon structure. While Furcht and Polla both disclose uses of microcantilevers, the combination of the ribbon structure in Polla with the Furcht reference does not make the embodiment of the invention in Claim 11 obvious. As discussed in the response to the Examiner's rejection of Claims as being anticipated by Furcht, the Furcht reference discloses a genetic testing system that uses a cantilever to detect the presence or absence of a specific analyte or specific DNA product, but not measureable characteristics of an analyte or DNA product. Claim 1, on which Claim 11 depends, contains a limitation that the invention comprise a detector that allows a measureable characteristic of the motile sample to be determined through analysis of the dynamic interaction of the force transducing sensor with said motile sample. This detection of a measureable characteristic goes beyond the presence or absence of a particular sample disclosed by Furcht or Polla. Applicants assert that as Furcht does not disclose the motion sensor set forth in Claim 1, Claim 11 is not obvious when Furcht is combined with Polla. Applicants further assert that Claim 11 is in condition for allowance over Furcht in view of Polla.

The Examiner rejected Claims 27 - 32 as obvious under §103(a) over Welland in view of Paritsky. Claims 27-32 have been cancelled.

Conclusion

Inasmuch as each of the objections have been overcome by the amendments and discussion above, and all of the Examiner's suggestions and requirements have been satisfied, it is respectfully requested that the present application be reconsidered, the rejections be withdrawn and that a timely Notice of Allowance be issued in this case.

Any shortages of fees due may be charged to, and any overpayments may be credited to, deposit account no. 50-1519.

Respectfully submitted,

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